



Caltrans Guidance on Incorporating Sea Level Rise

Caltrans Guidance on Incorporating Sea Level Rise provides guidance to Caltrans staff on how to assess the vulnerability of transportation projects to sea-level rise (SLR) impacts and incorporate adaptation into the programming and design of vulnerable projects. It was developed in May 2011 by the California Department of Transportation (Caltrans) pursuant to Executive Order S-13-08, issued by then Governor Schwarzenegger in November 2008.

This Caltrans guidance document provides a brief introduction to the sea level rise (SLR) projections for the state and the likely impacts to coastlines and transportation assets. The guidance incorporates the interim SLR scenarios developed in October 2010 by the interagency process led by the California Ocean Protection Council's SLR Task Force and Coastal and Ocean Working Group ("interim SLR guidance"). The interim SLR scenarios included projections of 7 inches (18 cm) of SLR by 2030 and an estimate of 40 inches (101 cm) under a low emissions scenario and 55 inches (140 cm) under a high emissions scenario by 2100. Subsequent to the issuance of this guidance, the National Academy of Sciences (NAS) released its study *Sea-Level Rise for the Coasts of California, Oregon, and Washington: Past, Present, and Future* in June 2012, as called for by Executive Order S-13-08, and the State of California issued updated SLR guidance in March 2013.

This guidance document describes a two-part analysis for determining and documenting whether to incorporate SLR into project

programming and design. First, projects are to be screened to determine whether they have potential for being affected by SLR. The screening phase focuses on three questions:

- Is the project located on the coast or another area vulnerable to SLR?
- Will the project be impacted by the stated SLR?
- Is the design life of the project beyond year 2030?

If initial screening determines that the project is not vulnerable to SLR, the analysis ends there and should be documented with an explanatory sentence or two in the Project Initiation Document.

Projects that pass the initial screen are then subject to the second part of the analysis. These projects are subject to a more rigorous assessment, balancing four categories of factors for determining whether SLR should be incorporated into the design of the project:

- the timeframe of the project,
- the consequences of failure,
- the adaptive capacity of the project, and
- the level of risk that the project planners are prepared to tolerate.

Within each category, the guidance suggests specific factors that the Project Development Team (PDT) should consider when conducting this analysis including: the project design life, the availability of alternative routes, anticipated travel delays, criticality of the asset for movement of goods or evacuations, traveler safety, the size of the public investment, the scope of the project, the effect of incorporating





SLR on interconnectivity with non-state highways, and environmental constraints.

Once a determination is made that SLR should be incorporated into a project, the guidance directs the PDT to conduct studies to (1) estimate the severity and extent of potential SLR impacts, and (2) evaluate options for preventing, mitigating, or managing the impacts to the project. First, PDT's must determine the SLR projections that should be used to evaluate potential impacts to a project. The guidance provides technical recommendations for identifying when the risk of impact becomes significant relative to the timescale of the project. It then discusses how PDTs should interpolate between SLR estimates at timescales not listed on the OPC table and use discretion to decide which SLR estimates to use for projects with a design life of 2070 and beyond. Second, the report then lays out eight recommended procedures for assessing the potential impacts to a project and developing adaptation strategies for the project. These include:

- gathering relevant information on existing vertical topographical elevations,

- assessing the role of local subsidence or uplifting,
- generating a plot of SLR for the project over the time period of concern,
- determining if relative SLR will have negative impacts on facility operations,
- determining whether adaptive measure will be necessary,
- identifying the costs SLR adaption measures,
- documenting any case where appropriate adaptation measures are not feasible, and
- incorporating incremental or staged improvements to address SLR where appropriate.

The guidance concludes by noting that other climate-related changes, including higher temperatures and more intense storms, create uncertainties that are difficult to quantify with any degree of confidence. It notes that Caltrans is partnering with a variety of entities to develop science to better understand and predict these impacts, and that future guidance may be issued.

Publication Date:

May 2011

For More Information:

http://www.dot.ca.gov/ser/downloads/sealevel/guide_incorp_slr.pdf

Resources:

Caltrans Guidance on Incorporating Sea Level Rise:

http://www.dot.ca.gov/ser/downloads/sealevel/guide_incorp_slr.pdf

State of California Sea-Level Rise Interim Guidance Document:

http://opc.ca.gov/webmaster/ftp/pdf/agenda_items/20110311/12.SLR_Resolution/SLR-Guidance-Document.pdf





Sea-Level Rise for the Coasts of California, Oregon, and Washington: Past, Present, and Future:
http://www.water.ca.gov/climatechange/docs/NRC_SLR_Draft-06-22-2012.pdf

State of California Updated Sea-Level Rise Guidance Document:
http://www.opc.ca.gov/webmaster/ftp/pdf/docs/2013_SLR_Guidance_Update_FINAL1.pdf

Prepared by the Georgetown Climate Center under cooperative agreement with the Federal Highway Administration.

